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10/823,045	04/13/2004	Sean Chang	Q1289	4098

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EXAMINER	
KOVAL, MELISSA J	

ART UNIT	PAPER NUMBER
2851	

DATE MAILED: 09/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/823,045	CHANG ET AL.	
	Examiner	Art Unit	
	Melissa J Koval	2851	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,5-7,9,10 and 12* is/are rejected.

7)☒ Claim(s) *3,4,8,and 11* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 April 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

Applicant is reminded of the proper content of an abstract of the disclosure.

A patent abstract is a concise statement of the technical disclosure of the patent and should include that which is new in the art to which the invention pertains. If the patent is of a basic nature, the entire technical disclosure may be new in the art, and the abstract should be directed to the entire disclosure. If the patent is in the nature of an improvement in an old apparatus, process, product, or composition, the abstract should include the technical disclosure of the improvement. In certain patents, particularly those for compounds and compositions, wherein the process for making and/or the use thereof are not obvious, the abstract should set forth a process for making and/or use thereof. If the new technical disclosure involves modifications or alternatives, the abstract should mention by way of example the preferred modification or alternative.

The abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art.

Where applicable, the abstract should include the following:
(1) if a machine or apparatus, its organization and operation;
(2) if an article, its method of making;
(3) if a chemical compound, its identity and use;
(4) if a mixture, its ingredients;
(5) if a process, the steps.

Extensive mechanical and design details of apparatus should not be given.

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract of the disclosure is objected to because it exceeds 150 words and includes the legal phraseology "means". Correction is required. See MPEP § 608.01(b).

Drawings

The drawings are objected to because Figure 5 includes prior art without clearly labeling it as such. See page 7 of the specification, section [0029]. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 5, 9, and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Takamoto et al. ('417 B1).

Refer to Figure 3 of Takamoto et al. ('417 B1) for an overall description of the projection system. Refer to the third embodiment shown in Figures 6A and 6B for a description of light in at least two different modes as passes through a prism and to the switching device.

Claim 1 sets forth: "An optical system for a projection display, comprising:

a light source for producing light (light source 11 emitting white light);

a light path switching device having a plurality of modes of operation for receiving and reflecting the light (See DMD 3 having ON and OFF modes. See column 5, lines 59 through 67.), the plurality of modes comprising at least a first mode for directing the light towards a projection lens of the projection display (Column 6, lines 1 through 8.) and a second mode for directing the light away from the projection lens (Refer to c olumn 6, lines 38 through 44 as well as projection optical system 4. Also refer to the

embodiment shown in Figures 6A and 6B, and described beginning in column 7, line 35 through 67, and continuing in column 8, lines 1 through 33. Based on the teaching given, the examiner interprets the light to travel in three modes, i.e.: ON light to the projection lens defining the first mode, ON light scattered in the prism defining the second mode, and OFF light defining the third mode.); and

a total internal reflection (TIR) prism set (See input/output separating prism system 2. Refer to the teaching of column 7, lines 35 through 41.) disposed between the light path switching device and the projection lens and comprising a first prism (prism 28 of Figures 6A and 6B.), a second prism (prism 27 of Figures 6A and 6B.) and a third prism (prism 29 of Figures 6A and 6B.), a first gap being formed between the first prism and the second prism and a second gap being formed between the first prism and the third prism (See surfaces 27b and 28b, respectively and column 7, lines 42 through 50.);

wherein the light enters the light path switching device by means of total internal reflection (Column 7, lines 51 through 54.); and, under the first mode, the light reflected by the light path switching device passes through the first and the second gaps and enters the projection lens (See column 6, lines 1 through 8. Also see the ON light reflected from P13 shown by solid lines in Figure 6B.), whereas under the second mode, the light reflected by the light path switching device is totally reflected at the boundary between the first gap and the second prism and away from the projection lens (See scattered light 61 in Figure 6B.)."

Claim 5 sets forth: "The optical system according to claim 1, wherein the light path switching device is a micromirror array that consists of a plurality of micromirrors each receiving and reflecting the light." See column 6, lines 17 through 24 of '417 B1.

Claim 9 is rejected for the same reasons applied to already rejected claim 1.

Claim 12 is rejected for the same reasons already applied to rejected claim 5.

Claims 1, 2, 5, 6, 9, 10 and 12 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Okamori et al. ('048 B1).

Refer to Figure 1 of Okamori et al. ('048 B1), for example.

Claim 1 sets forth: "An optical system for a projection display, comprising:

a light source for producing light (light source for illumination 8);

a light path switching device having a plurality of modes of operation for receiving and reflecting the light (variable mirror element 3), the plurality of modes comprising at least a first mode for directing the light towards a projection lens of the projection display (See ON light 21 and projection lens 5.) and a second mode for directing the light away from the projection lens (See OFF light 22 and 23.); and

a total internal reflection (TIR) prism set disposed between the light path switching device and the projection lens (prism 1) and comprising a first prism (prism piece 11), a second prism (prism piece 12) and a third prism (prism piece 13), a first gap being formed between the first prism and the second prism (See column 17, lines 28 through 37.) and a second gap being formed between the first prism and the third prism (See column 17, lines 8 through 16.);

wherein the light enters the light path switching device by means of total internal reflection (Total internal reflection is first discussed in column 14, lines 42 through 67. See how illuminating ray 20 is totally reflected at first inner surface 114A toward variable mirror element 3.); and, under the first mode, the light reflected by the light path switching device passes through the first and the second gaps and enters the projection lens (Again, see ON light 21 in Figure 1.), whereas under the second mode, the light reflected by the light path switching device is totally reflected at the boundary between the first gap and the second prism and away from the projection lens (See OFF light 22, for example, and second inner surface 22, for example. Also refer to Column 15, lines 1 through 15.)."

Claim 2 sets forth: "The optical system according to claim 1, wherein the light that is totally reflected at the boundary between the first gap and the second prism under the second mode is further reflected on the surface of the second prism closest to the light path switching device under the second mode." Follow OFF light 22 as it reflects at second outer surface 121. Refer to column 15, lines 44 through 50.

Claim 5 sets forth: "The optical system according to claim 1, wherein the light path switching device is a micromirror array that consists of a plurality of micromirrors each receiving and reflecting the light." Refer to variable mirror element 3 as described in column 13, lines 56 through 63. Also see the BACKGROUND OF THE INVENTION of '048 B1 for more teachings on DMDs.

With respect to claim 6, refer to the embodiment shown in Figure 27 of '048 B1.

Claim 6 sets forth: "The optical system according to claim 1, further comprising a light guide (rod element 83) disposed between the light source and the TIR prism set." The remarks set forth in the rejection of claim 1 apply with the exception of the light source, which is shown to be light source lamp 81 in Figure 27 rather than light source 11 of Figure 1.

Claim 9 is rejected for the same reasons applied to already rejected claim 1.

Claim 10 is rejected for the same reasons applied to already rejected claim 2.

Claim 12 is rejected for the same reasons applied to already rejected claim 5.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takamoto et al. ('417 B1) in view Nishikawa et al. ('940 B2).

Claim 6 sets forth: "The optical system according to claim 1, further comprising a light guide disposed between the light source and the TIR prism set."

Takamoto et al. ('417 B1) show all of the elements of claim 6 except for a light guide disposed between the light source and the TIR prism set.

Nishikawa et al. ('940 B2) teach an analogous projection system to that taught by Takamoto et al. ('417 B2). The projection optical system of '940 B2, as shown in 1A (ON

state) or Figure 2 (OFF state), includes a light guide (integrator rod 6) and TIR prism PR similar to the PRIOR ART shown in Figures 7A or 7B of ('417 B2), for example. Therefore, Nishikawa et al. ('940 B2) show all of the elements of claim 6 except for a three prism TIR prism system having two air gaps. It is an object of the invention for both Takamoto et al. ('417 B1) and Nishikawa et al. ('940 B2) to provide projection optical systems improved over the prior art to produce a high contrast projection image. It is also well known in the art, that a light guide or light integrator can be used to improve uniformity of illumination on the face of the DMD. See column 5, lines 33 through 42, of '940 B2. Furthermore, The teaching of '417 B1 discusses how scattered light can be caused by structural problems at the face of the DMD 3. See Column 7, lines 60 through 67, and column 8, lines 1 through 5, of '417 B1.

Therefore, in view of the teachings described above, it would have been obvious to one having ordinary skill in the art at the time the invention was made that improving illumination at the surface of the DMD will reduce scattered light inside the prism, thus reducing ghost images and resulting in a high quality, high contrast image on screen. Also, it would have been obvious to one having ordinary skill in the art at the time the invention was made in view of the teachings described above, that the three prism TIR prism system of '417 B1 is improved over the two prism TIR prism system of '940 B2. Furthermore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to include a light guide such as the integrator rod 6 of '940 B2 in between the light source and the TIR prism set in the projection system of '417 B1, thus meeting the limitations of claim 6. The motivation for one of ordinary skill in the

art to add a light guide to the system of '417 B1 being to improve uniformity of illumination at the face of the DMD to reduce scattered light and improve overall contrast and quality of the system.

Claim 7 sets forth: "The optical system according to claim 6, further comprising a relay lens disposed between the light guide and the TIR prism set." Takamoto et al. ('417 B1) do not specifically describe the combination of elements forming a lens/mirror illumination system comprising parallel conversion lens 13, mirror 14, and condenser lens 15 as a relay lens system. Nishikawa et al. ('940 B2) show relay lens unit 9, for example. Both illumination systems of either '417 B1 or '940 B2, bend the illumination light to the right. Again see column 5, lines 33 through 42 of '940 B2. Integrator rod 6 and relay lens unit 9 are described therein as being part of illumination optical system IL. As already described in detail with respect to the rejection of claim 6, uniformity of illumination on the surface of the DMD is an object of providing the illumination optical system IL to the invention. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to replace the lens/mirror illumination system comprising conversion lens 13, mirror 14, and condenser lens 15 with the entire Illumination system IL for the reasons already given in claim 6 to combine references, thus meeting the limitations of claim 7.

Allowable Subject Matter

Claims 3, 4, 8, and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record neither shows nor suggests an optical system comprising all of the elements of claim 3 and the combination of a light absorbing area, for receiving light in a particular mode, located on a particular prism surface as follows: "wherein the light leaves the optical system via a side surface of the second prism under the second mode, and a light-absorbing substance is applied on the side surface."

Similarly, the prior art of record neither shows nor suggests an optical system for a projection display having all of the elements of claim 11 and using a light-absorbing substance oriented as follows: "The projection method according to claim 9, wherein under the second mode the light leaves the optical system via a side surface of the prism that the light reflected by the light path switching device first meets, and a light-absorbing substance is applied on the side surface."

The prior art of record neither shows nor suggests an optical system for a projection display having the combination elements as set forth in claim 8, and particularly guiding the light as follows: "wherein the light enters the optical system via the first prism; and the light leaves the optical system via the third prism under the first mode whereas it leaves the optical system via the second prism under the second mode."

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Yamamoto US 2003/0142278 A1 teaches an optical system for projector and projector using it.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melissa J Koval whose telephone number is (571) 272-2121. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Judy Nguyen can be reached on (571) 272-2258. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Melissa Jan Koval

MJK